

USER FUNCTIONS DESCRIPTION

USER MANUAL COMPLEMENT

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1. Basic information

Beside basic measuring functions all balances are equipped with the set of special user functions.

Standard balance features the following functions:

- basic set of special functions, including:
 - formulation,
 - pieces counting
 - autozero
 - serial port working mode setting
 - serial port parameters setting
 - percent weighing,
 - weighing unit (gram/carat)
 - calibration options

On customers' request the balance may be equipped with:

- additional set of special functions, including:
 - animal weighing,
 - maximum value,
 - anti-stroke filter,
 - constant tare,
- checkweighing
- total weight function
- liquid and solids density determination
- paperweight determination*

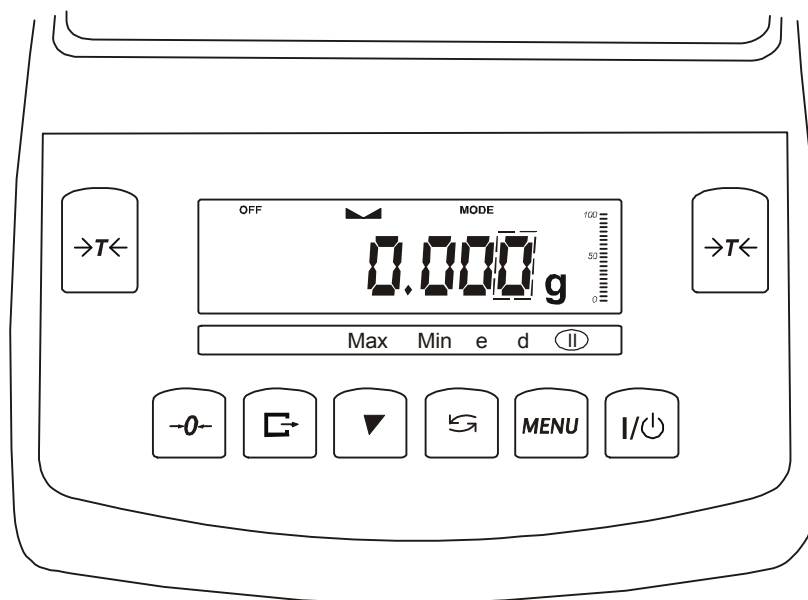
This brochure describes the functions not explained in user manual (i.e additional functions set).

* Functions available with special scale program (with limited use of other functions).

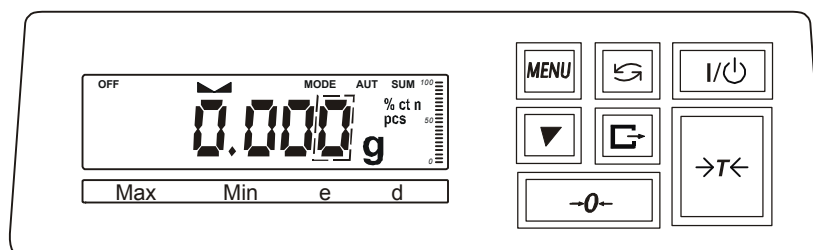


2. Keys and indicators

AG/C balances:



AD balances:



Keys:

- | | |
|------|--|
| →T← | - tare (subtract package weight from weighed mass) / accept chosen option, |
| →0← | - zeroing (optional), |
| □→ | - data output (print / transmission), |
| ▼ | - internal calibration (not apply for AD balances) / quick option listing, |
| X | - working mode switching: special function / weighing, |
| MENU | - special function menu, |
| I/⏻ | - switch-on / switch-off (standby), |



Indicators:

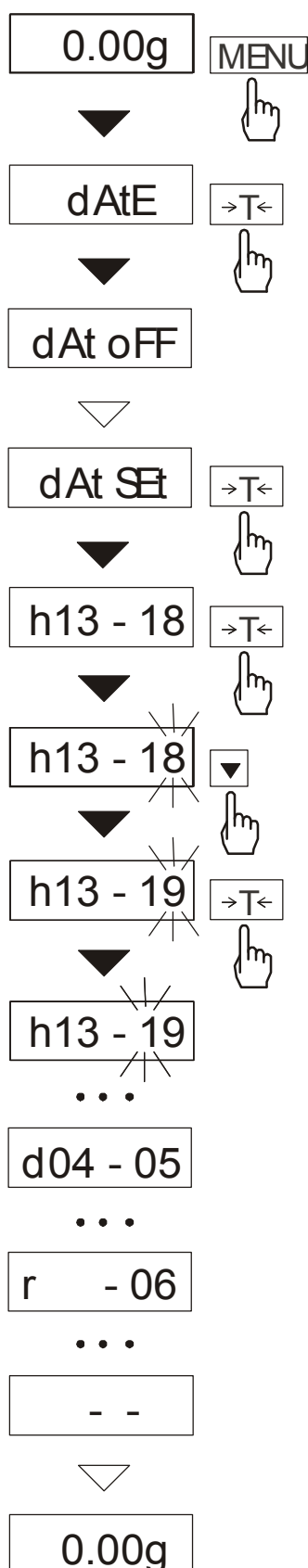
	- result stabilisation,
wskaźnik liniowy	- total load indicator (0-100%),
OFF	- stand-by mode,
MODE	- special functions menu,
Max, Min, d, e, II	- metrologic parameters.

To enter numeric values use the following keys:

▼	- digit increase,
□→	- decimal point,
→T←	- next digit,
MENU	- end.



3. Date and time setting (dAtE)



This function enables to set current date and time of internal balance clock and enable/disable date and time on weighing result printouts.

Options:

- *dAt oFF* – deactivate date printout,
- *dAt on* – activate date printout (↵ key),
- *dAt SEt* – change date and time.

The example at the left presents how to set current date and time.

Change successive numbers using ▼ key.

To move to the next position use →T← key.

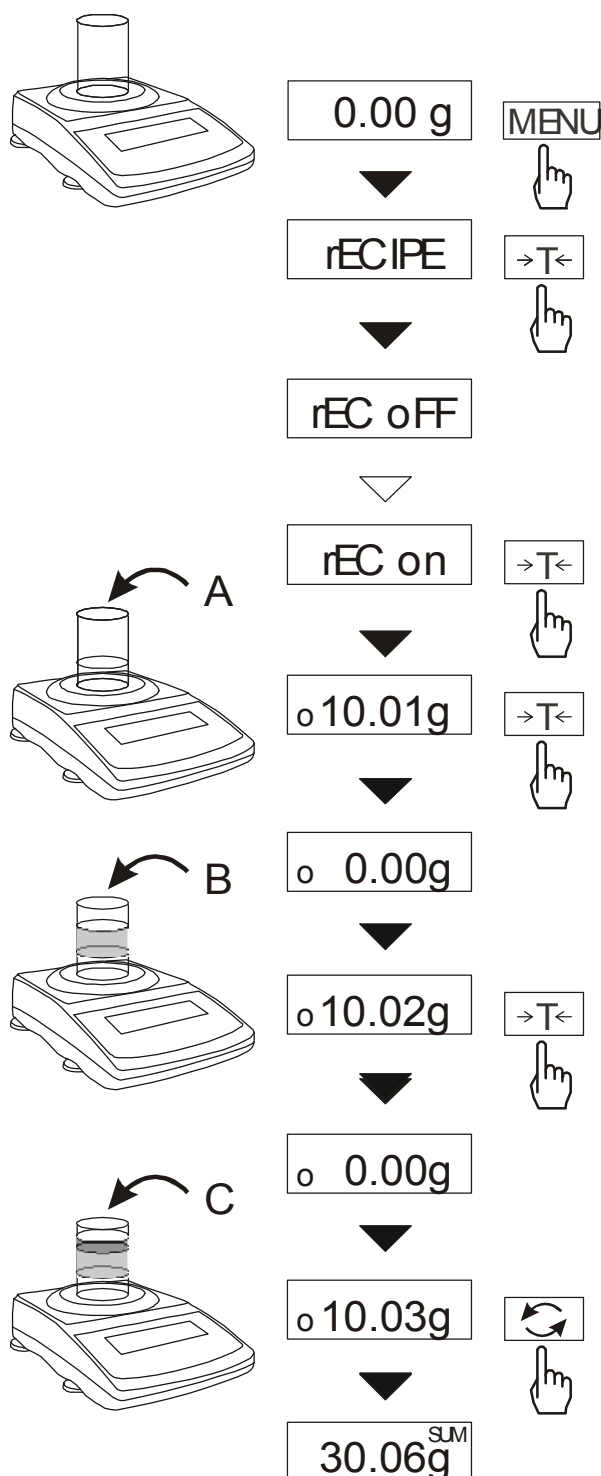
Time format: *h gg – mm*
(gg - hour, m - minute).

Date format: *d mm – dd*
(m - month, d - day).

Year format: *r - rr*
(r - two last digits of a year).



4. Formulation function (*rECIPE*)



This function allows separate weighing of several ingredients in one container with a possibility to control aggregated sum of all weighed components.

Function options:

- rEC oFF* – leave the function to read aggregated weight,
- rEC on* – start recipe formulation
- rEC Con* – return to formulation.

Before weighing each of successive recipe ingredients (A, B, C, etc.) make sure the balance displays zero indication or simply tare the balance with **→T←** key.

For instance access to aggregated recipe weight indication press **X** key or use *rEC oFF* option from the function menu.

To return to the current recipe press **X** key again or use *rEC Con* option.

Note:

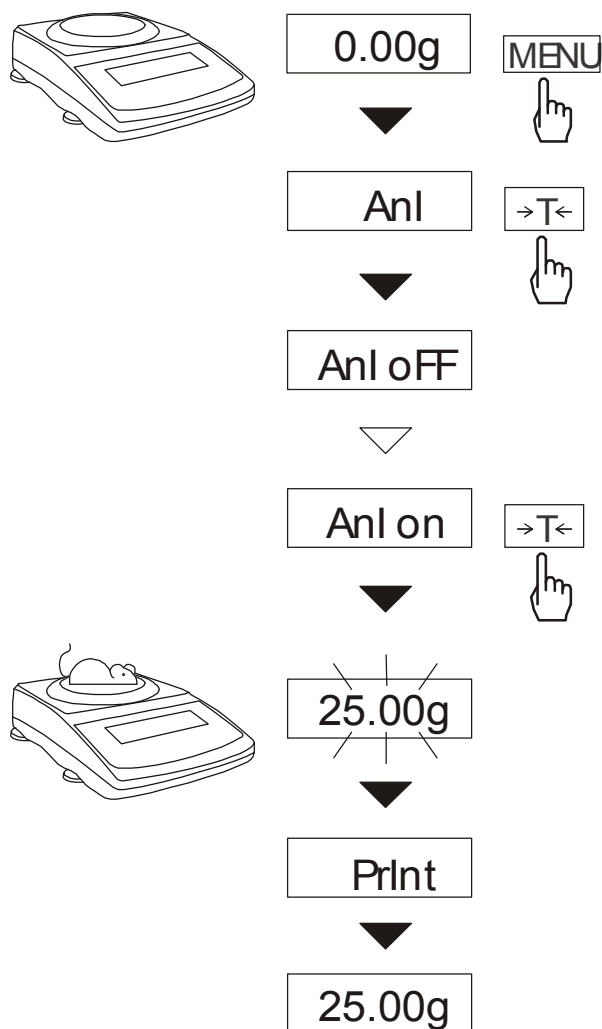
If „o” indication is displayed at the left of the display, *rECIPE* function is active.

Aggregated weight of the recipe is displayed when **SUM** indicator is lit (after using *rEC oFF* option or **X** key). To remove **SUM** indicator press **→T←** key.



5. Animal weighing (AnI)

This function allows precise animals weighing.



Press *MENU* key. When *AnI* function is displayed press →T← key.

Function options:

- *AnI oFF* – leave the function,
- *AnI on* – automatic weighing after loading the balance,
- *AnI Prn* – the measurement initiated manually (by pressing key).

For automatic weighing press →T← key when *AnI on* is displayed.

Tare the balance when necessary and place the animal on the pan.

Wait until the weighing result is averaged (the indication blinks). Final result is displayed on the display and send via serial port to computer or printer.

Remove the animal from the pan – the result is displayed for 30s and then the balance starts the new measurement.

Important notes:

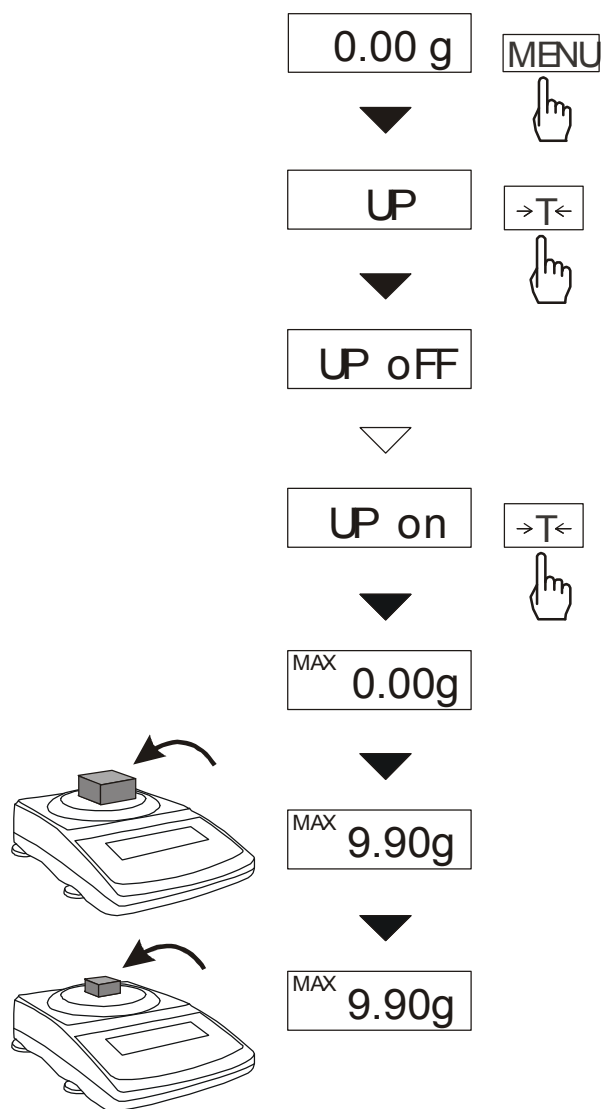
1. The load less than Min is not averaged.

2. In case placing the animal takes more than 5s, it is advised to use *AnI Prn* option (manual weighing with key).



6. Maximum value (UP)

This function enables to display the maximum value from the series of weighing.



Make sure the balance displays zero indication before starting measurements.

Enter the function menu with MENU key and choose UP function. The displayed indication is the highest value from the series of measurements.

Press $\rightarrow T \leftarrow$ key to zero the indication.

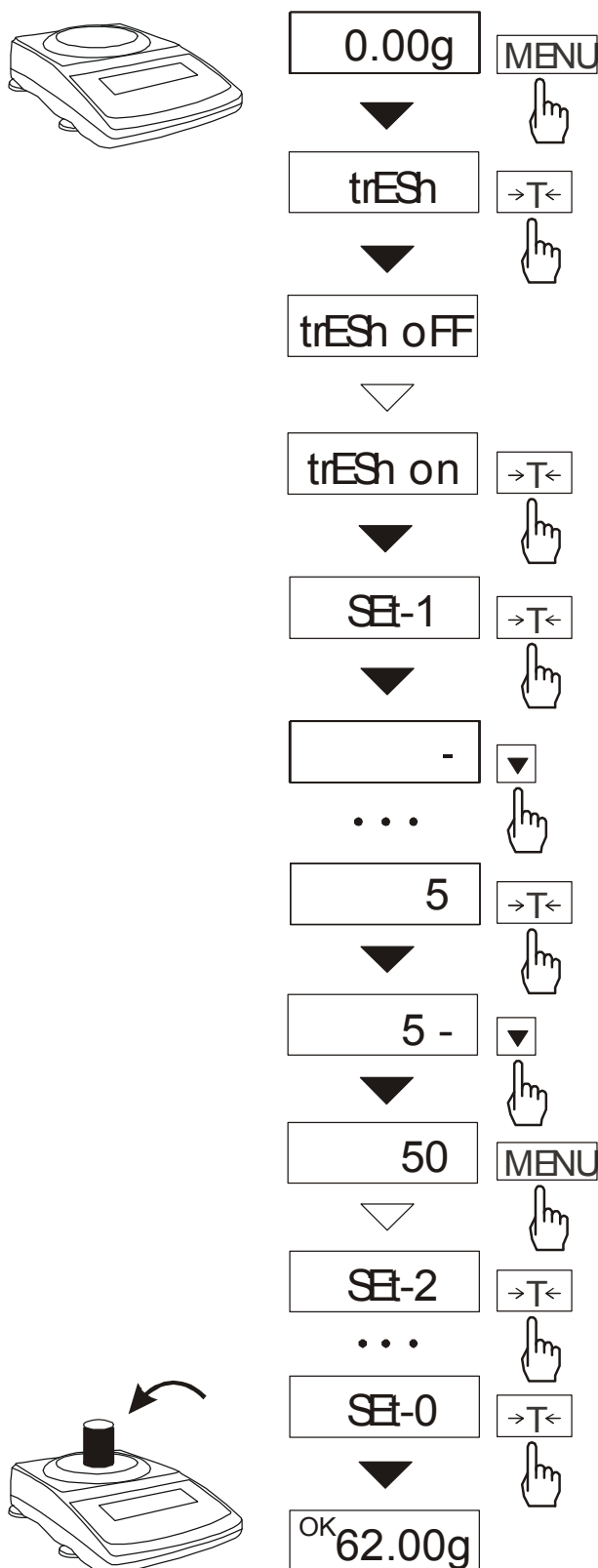
Note:

Autozero function and the stabilisation indicator are deactivated when UP function is active. The indication is the result of continuous averaging of 5 measurements.



7. Checkweighing (trESh)

This function compares weighing result with two reference values: lower and upper threshold. The balance signalises comparison result with MIN, OK and MAX indicators and sound signal generated when threshold values are exceeded.



Press **MENU** key and choose *trESh* function with **→T←** key.

The following options are displayed:

- *trESh oFF* – deactivate the function,
- *trESh on* - activate the function,
- *trESh Prn* - check current threshold values (use **↵** to display successive values).

Choose *trESh on* option with **→T←** key. Following options are displayed:

- *SEt-0* - start the function with the excess signalisation,
- *SEt-1* - set lower threshold value,
- *SEt-2* - set lower threshold value,
- *SEt-3* - set zero excess signalisation,

Set the lower and the upper threshold values with the following keys:

- ▼** - digit increase,
- ↵** - decimal point,
- T←** - next digit,
- MENU** - end.

When necessary, use *SEt-3* option to set the zero threshold value (indications below this value are regarded as unloaded balance – see **THRESHOLD** interface description).

To start checkweighing function use *SEt-0* option.

To leave the function, press **MENU** key and choose *trESh* and *trESh oFF* options.



If comparison result is:

- smaller than lower threshold – the balance displays MIN,
- between threshold values - the balance displays OK with the sound signal when exceeding the threshold,
- greater than upper threshold - the balance displays MAX with the sound signal when exceeding the threshold,

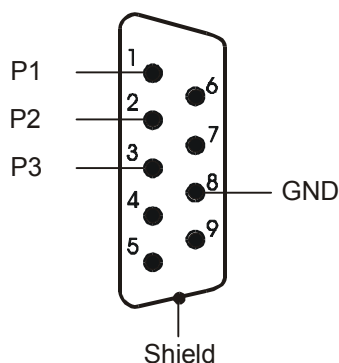
If the balance is equipped with *THRESHOLDS* control connection, the comparison result may be used to control the external optical signalling device, or other external devices.

On the outputs *P1* and *P2* the short-circuit states appear, which depend on comparison results of balance indications with threshold values. The available operation modes are shown on the states chart.

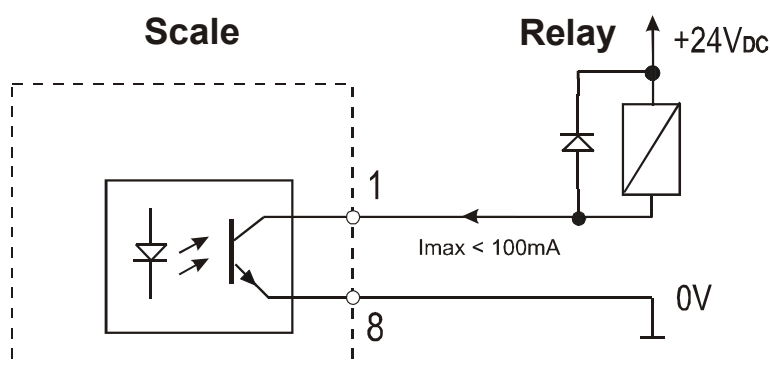
The *THRESHOLDS* connection contains three transistor outputs P1, P2 and P3 of open collector type, with load capacity 100mA/24V. The connected relays are not supplied from the balance and require additional 24V power supply unit. The relays inputs must be protected with diodes, e.g. 1N4148.

The balance producer offers ready electronic PCB MS3K/P, which contains RM96P relays with input voltage DC24V and output: AC250V, 8A.

THRESHOLD connection



Scheme for connecting the single relay to *THRESHOLDS* connection output



Important notes:

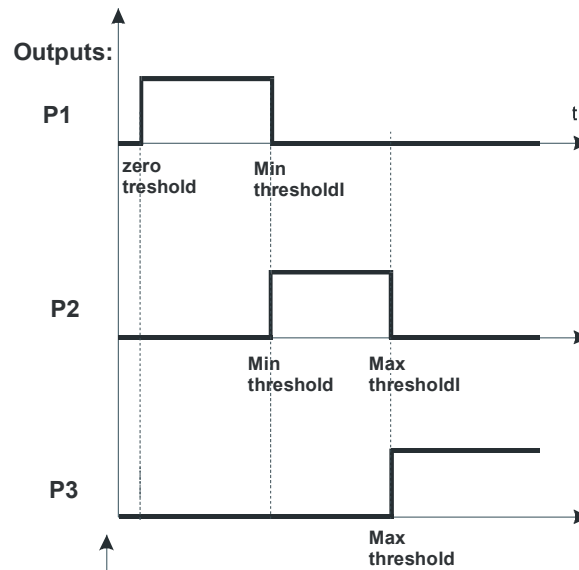
After switching the balance on, both thresholds are set as maximum values.

When selecting upper threshold value, pay attention that its value is not greater than the lower threshold value.

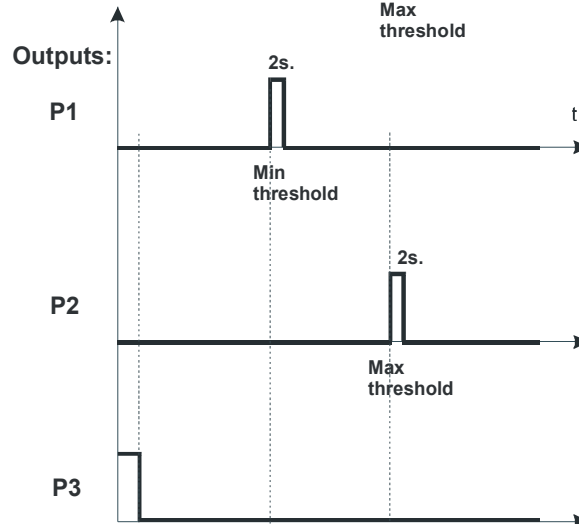


THRESHOLDS outputs states chart (with increasing balance load):

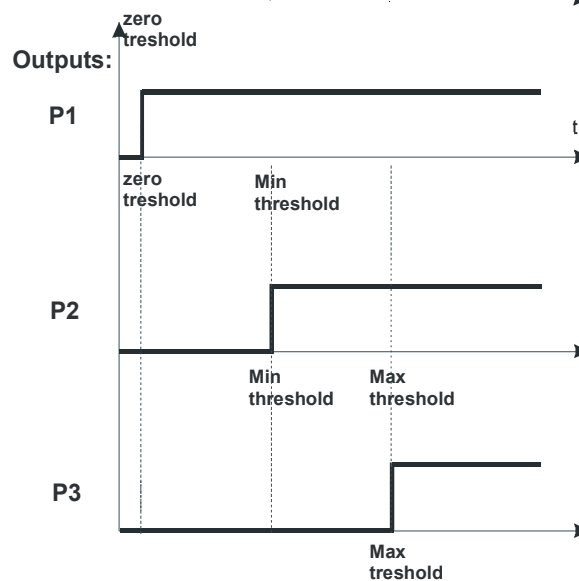
1. *Signalling device* mode:



2. *Impulse* mode
(approx. 2 sec.):



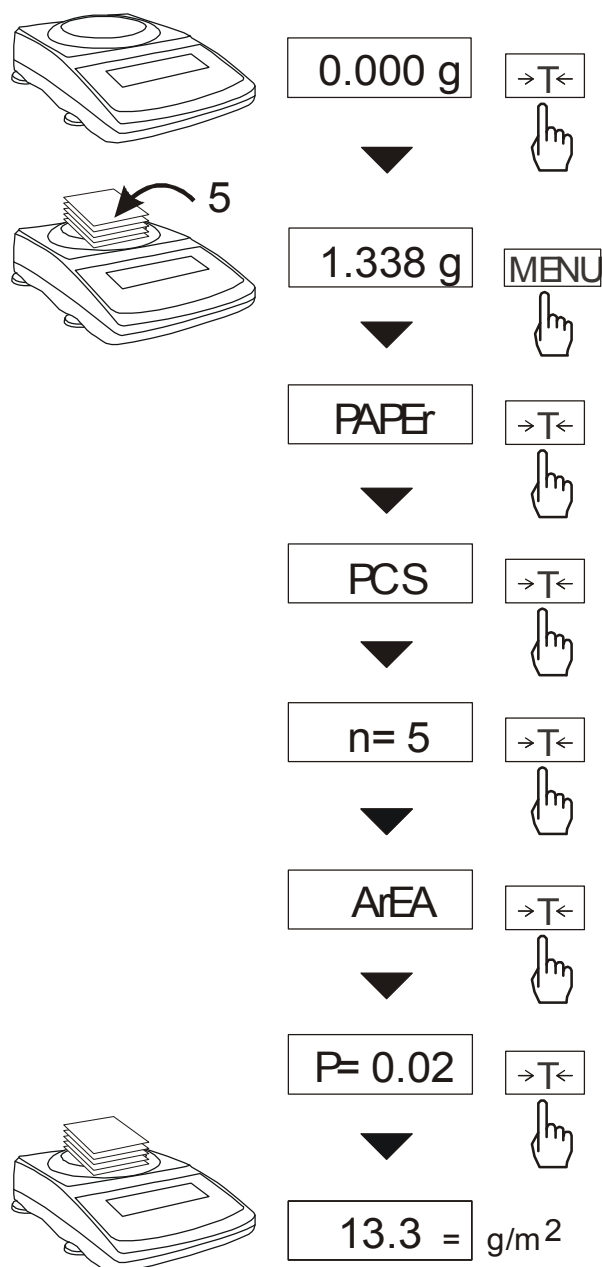
3. *Level* mode:





8. Paperweight calculation (PAPeR)

This function enables to calculate paperweight of 1m^2 of paper basing on samples of known area. For quick access, the function is accessible directly by pressing X key.



The balance must be tared just before the measurement.

Place the specific sample quantity of the same area (possible values: 1, 2, 5, 10, 20, 50, 100).

Press *MENU* key to access Function Menu. To enter the function press **→T←** key when "PAPeR" is displayed.

PCS is the number of samples placed on the pan. To choose previously used value, select *old* option.

"ArEA" is the area of a single sample. It is possible to choose standard values (0,02 or 0,1g/m²) or enter specific value ("A" option).

To enter the value use the following keys:

- ▼ - digit increase,
- - decimal point,
- T← - next digit,
- MENU* - end.

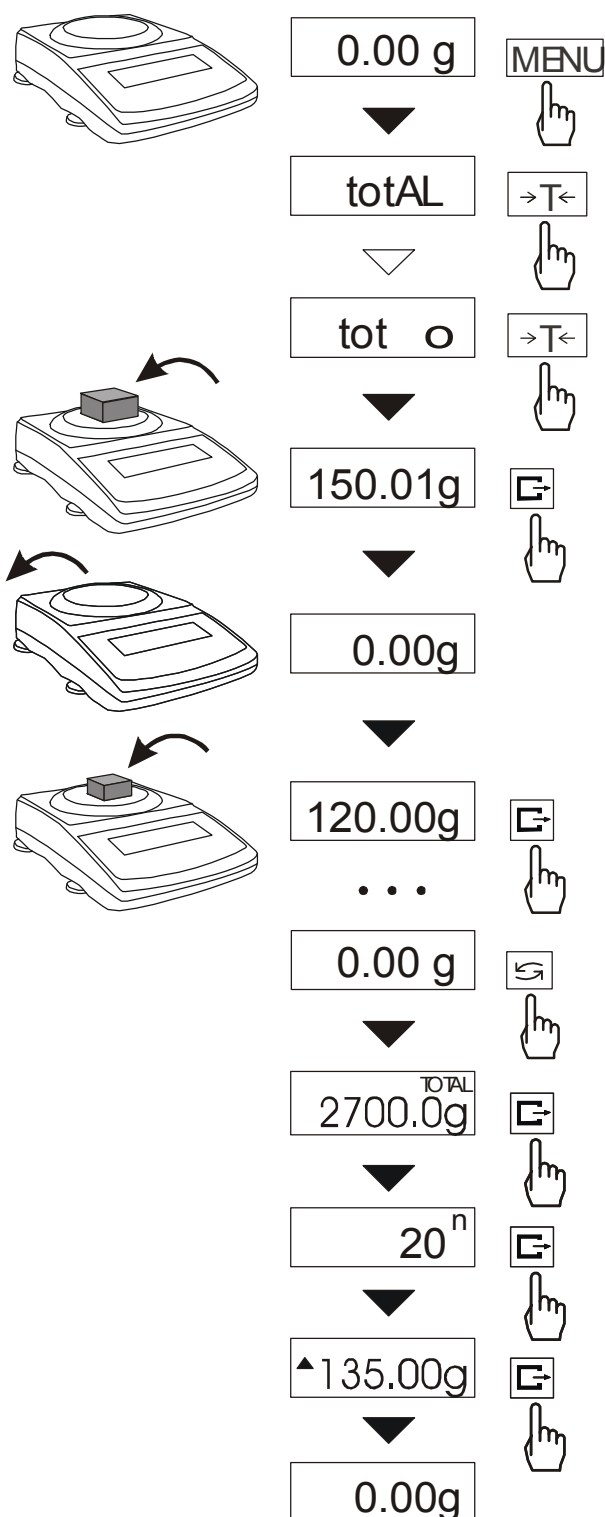
The result of paperweight measurement is finished with "=" mark pointing g/m² unit.

The balance is ready for the next measurements.



9. Total weight function (totAL)

The function enables to calculate total weight of series of measurements greater than the balance capacity.



To enter the function, press **MENU** key and choose *totAL* option with **→T←** key.

The following options are displayed:

- *tot Prn* - report printout without clearing the adding register,
- *tot oFF* - report printout with clearing the adding register,
- *tot □* - report printout after each measurement,
- *tot -* - report printout disabled.

Press **→T←** key when *tot 1* is displayed.

Place successive samples on the pan and press **↵** after each measurement to store the value in the adding register

To display current results press **X** key or enter *totAL* function menu and choose *tot Prn* option.

The results are display in the following order:

- total weight (*TOTAL*)
- number of registered measurements (*n*),
- average value (**^**).

To continue total weighing without clearing the adding register press **X** key again. To clear the register and start the new series of measurements press **↵** key for the third time.



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To leave the function with clearing the adding register, enter *totAL* function menu and choose *tot oFF* option. When connected to a printer, the balance prints the communicate informing about clearing the register.

The sample check for each measurement:

Date:	...	Time	...
measurement no		weight	
<hr/>			

Report printout sample:

Date:	...	Time	...
TOTAL WEIGHT		=	
NUMBER OF SAMPLES		=	
AVERAGE VALUE		=	

Note:

Maximum number of measurements 99 999.

Maximum total load 99 999 000d.

The weighing unit of the aggregated value from the register (total) is the same as the weighing unit stated on the keypad or is 1000 times greater (signalised with “o” indicator at the left of the display).

If the registered value is too big to be displayed, “E” communicate appears on the display.

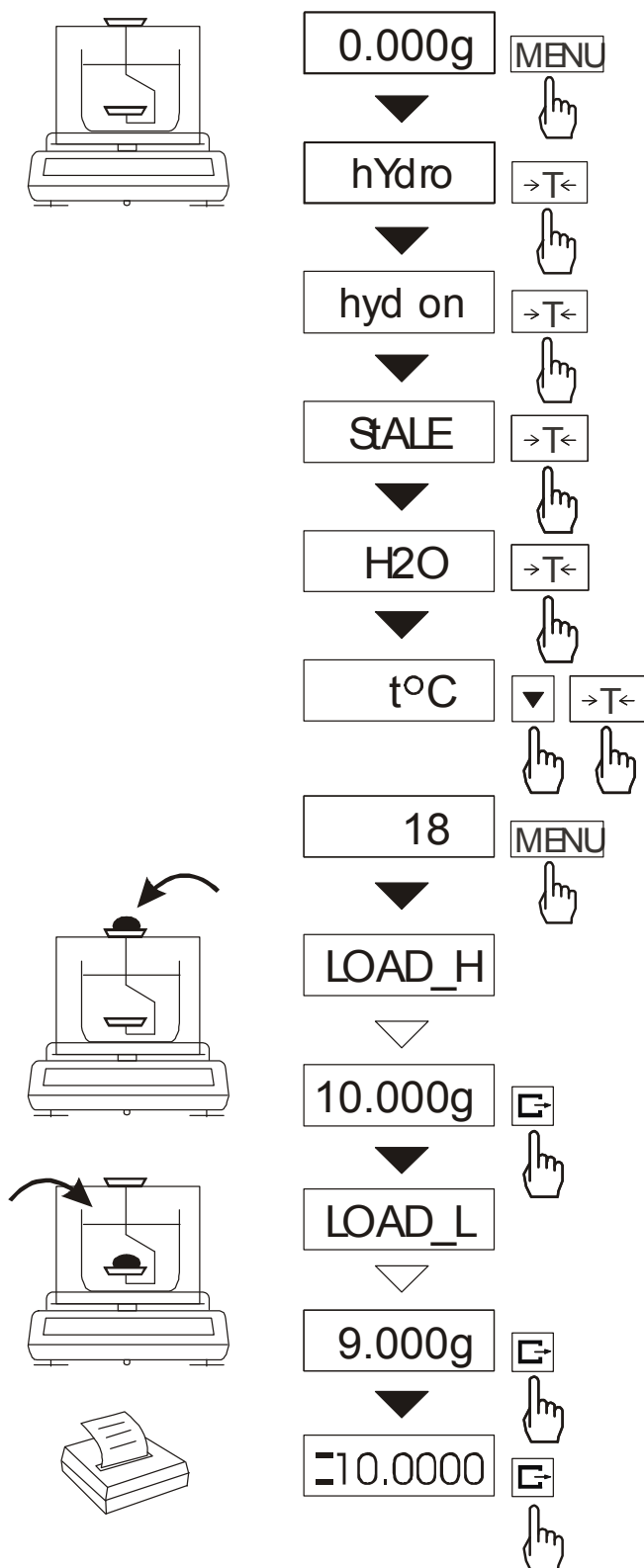
If the number of series is too high to be displayed, “Err1” communicate appears on the display.



10. Density determination (hYdro)

The description below describes density determination using HYDRO kit. In case below-balance weighing, operation sequence does not change.

10.1. Solids density determination



This function calculates material density basing on its weight in air and in water using the formula below:

$$\rho = \frac{m_1}{m_1 - m_2} * \rho_L$$

where, m_1 – weigh in air

m_2 – weight in water

ρ_L - density of liquid

If distilled water is used, enter its exact temperature (accurate to 0,5°C) – the balance will calculate its density automatically.

To enter the value use the following keys:

▼ - digit increase,

↵ - decimal point,

→T← - next digit,

MENU - end.

When using liquid other than distilled water, choose OTHER (instead of H2O) option and enter its density according to its temperature.

Phase I: measurement in air.

Phase II: measurement in liquid.

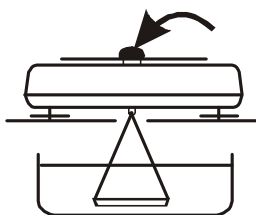
To print measurement result and begin next measurement press **↵** key.



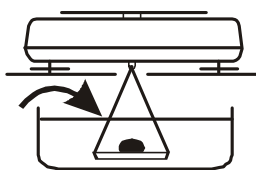
To print a density determination report after all necessary measurements, connect a printer to the balance and press P key. A sample for solid mass density determination is shown below:

Date: ...	Time ...
MEASUREMENT NO.	= ...
WEIGHT in air	= ... g
WEIGHT in a liquid	= ... g
DENSITY	= ... g/cm ³
Liquid density	= ... g/cm ³
Liquid temperature	= ... °C

Operation sequence (weighing in air and in liquid) for below-balance weighing:



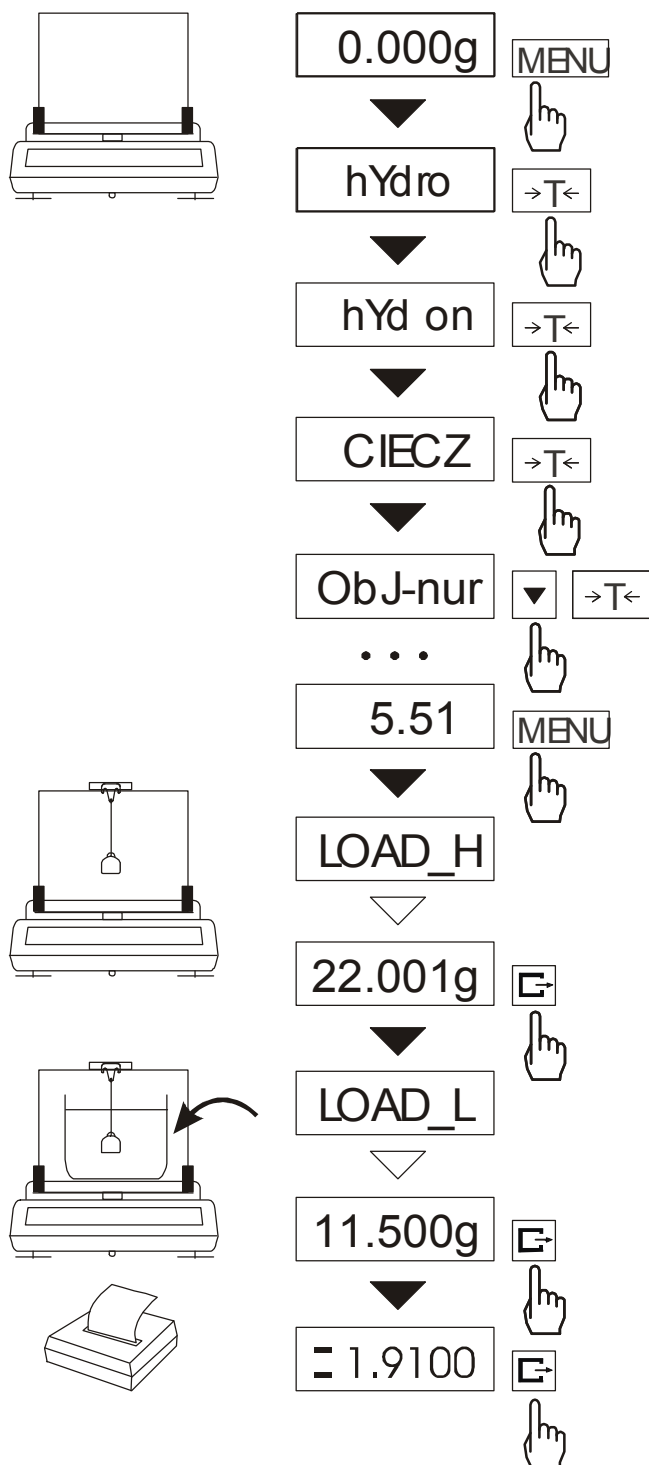
Phase I: measurement in air.



Phase II: measurement in liquid.



10.2. Liquid density determination



This function determines liquid density basing on plunger weight in air and in examined liquid with known volume, using the formula below:

$$\rho = \frac{m_1 - m_2}{V}$$

where

m_1 – plunger weight in air

m_2 – plunger weight in a liquid

V – plunger volume

Plunger volume is stored on its hanger.

To enter the value use the following keys:


- ▼ - digit increase,
- ↵ - decimal point,
- T← - next digit,
- MENU - end.

Phase I: measurement in air.

Phase II: measurement in liquid.

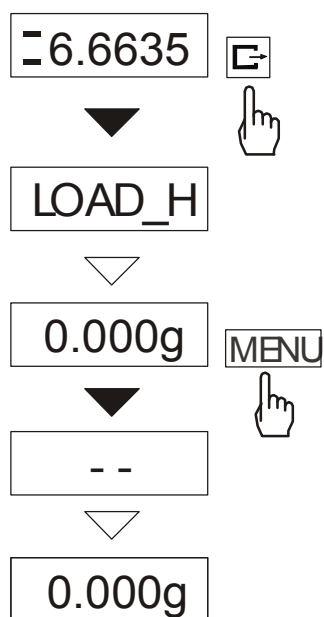
To print measurement result and begin next measurement press ↵ key.



To print a density determination report after all necessary measurements, connect a printer to the balance and press  key. A sample for liquid density determination is shown below:

Date: ...	Time ...
MEASUREMENT NO.	= ...
WEIGHT in air	= ... g
WEIGHT in a liquid	= ... g
LIQUID DENSITY	= ... g/cm ³
PLUNGER VOLUME	= ... g/cm ³

10.3. Leaving the function



To stop using the function, follow operation sequence as shown on the picture.

In other case the balance begins next density measurement.



Notes